Ocean Energy Forum 

Draft Strategic Roadmap

Key Recommendation 4.4

Create and insurance fund to underwriter demonstration projects' risks:

Design for an insurance fund for first arrays

Prepared for:

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OEF Session 2

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Context;	Following publication of the Forum's *Draft* Strategic Roadmap in October 2015 (where 6 key recommendations were outlined to help develop the ocean energy sector), the Forum has been tasked with producing action plans for each recommendation to help realise the aims and ambitions of the Roadmap. The actions plans will be reflected in the final Strategic Roadmap due to be published in November 2016. **Key recommendation 4.4** Lack of empirical experience and deployment data results in uncertainties about ocean energy projects' operation and production. This means that ocean energies bear a higher technological and financial risk compared to more mature energy technologies. In Edinburgh, we will discuss the proposal for a new risk-sharing fund including guidelines on how to establish such a fund.
About this Paper;	This paper sets out how such an insurance fund could be set-up, how it could function with which criteria and which private and public stakeholders would be required to participate. The paper and the associated questions will be discussed at the Forum's open session conference in Edinburgh. All Forum members are welcome to participate and contribute to Session 2 discussion.
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EIB marine energy technology insurance fund Next Steps

The Ocean Energy Forum's draft Roadmap (October 2015), puts forward an action plan with six key recommendations to bring the ocean energy sector forward to commercialisation and industrial roll-out. The action plan recommendations are designed to tackle the main barriers at each phase of ocean energy's development.

For the Demonstration and Pre-Commercial phases, the creation of an EU-wide insurance fund is envisaged to underwrite risks and fill the gaps in insurance and OEM warranty structures so as to make marine energy demonstration arrays more "investable" (draft roadmap section 4.4).

A presentation as part of a working group in Brussels including representatives from DG Mare and the European Investment Bank was organised (relevant extracts from both attached as appendices).

Initial feedback from DG Mare has been very encouraging, while the EIB acknowledged that an insurance fund would be very beneficial to the process of financing these arrays.

This paper sets out how such an insurance fund could be set-up, how it could function with which criteria and which private and public stakeholders would be required to participate.

Concept of paper/questionnaire

The onus is now on participants in the marine energy sector to refine these initial thoughts so as to provide more detailed proposals regarding in particular:

1. Objectives of such an insurance fund
2. Which risks need to be covered in such a fund;
3. What financial exposure should the fund absorb,
4. What geographical criteria could condition eligibility for support under the insurance fund;
5. What due diligence procedures should be in place before any technologies are accepted into the insurance fund;
6. How should the proposed insurance fund be structured;
7. With what – if any - degree of risk-sharing;

1. Rationale and objectives of such an insurance fund

1.1 Why an insurance fund?

OEF Roadmap section 4.4: Lack of empirical experience and deployment data results in uncertainties about ocean energy projects' operation and production. This means that ocean energies bear a higher technological and financial risk compared to more mature energy technologies.

At project level, this risk is currently overwhelmingly borne by the project developers, both limiting their pool of potential equity finance and making it difficult to leverage their funds to access commercial project finance.

An insurance fund to insure project revenues in the early years would make projects considerably more investable. A sectoral pan-EU approach, covering all demonstration and pre-commercial farms could absorb a large share of this risk element and, thereby, lower the cost of capital and ease access to finance.

The fund would underwrite project risks such as availability, output performance, mechanical breakdown and defect, and could provide long-term decommissioning bonds. It would be subject to suitable acceptance, risk-sharing and eligibility criteria. A relatively small amount of risk underwriting capital should be able to leverage a considerably larger amount of finance into the projects.

1.2 Which objectives for maximal impact

The main objective of the fund is to bridge the risk-gap between project developers and device manufacturers planning demonstration and pre-commercial farms.

The fund aims at removing the largest possible share of risk on both sides to leave an acceptable level of risk, comparable to projects on more advanced energy technologies. It remains important that a share of risk remains with manufacturers/operators to encourage best practice and technology use.

The fund should be workable for all stakeholders within the industry but also sufficiently robust to:

- encourage the EU Commission and potentially the EIB to provide seed capital to the insurance fund as a justifiable use of public monies;
- provide a recognised seal of approval to external investors and project financiers in addition to filling the gaps required for their financial approval;
- Ensure that initial seed funding can be recycled after some years, as projects already insured mature, become closer to a regular power curve and can find equivalent insurance packages on the insurance market-place (provided they will have been created);
- Potentially, if judged appropriate by the sector, provide a platform to bring in private risk capital to bolster the seed capital as the number of arrays, spread of risk and need for risk capital expands;

2. Risks to be covered

2.1 Where/what are the gaps?

1) *Standard commercial project insurances:* Subject to the detailed review by the commercial insurance market, most marine energy technologies can be insured for broad "all risks" insurance for replacement cost following material damage during installation and operation. Significantly, until the necessary operating hours are achieved and suitable data produced, new technologies will not normally be covered for machinery breakdown and defect risk.

   Note: At a later stage, when insurers are prepared to consider machinery breakdown insurance coverage, this will be influenced by what OEM warranties are available.

   In addition to the replacement cost insurance, loss of revenue cover can normally (subject to additional insurer due diligence on supply chain / replacement times etc.) be obtained following an insured material damage loss for a defined period. So if machinery breakdown is excluded on the material damage section, it will also be excluded on the loss of revenue section.

   The standard commercial insurance will also not provide cover for inefficacy / failure to perform e.g. to the power curve, but will require an insured event as a trigger.

2) *OEM Warranties:* The potential for any recoveries following mechanical failure / defect / performance deficiency will therefore fall on what can be claimed back from Original Equipment Manufacturer (OEM) warranties, at least in the first two or three years of a demonstration project. Successful demonstration will make breakdown cover and broader defect cover more readily available from commercial insurers thereafter.

   Different OEM's will have different appetite for and/or ability to provide "investable" warranties. Some will for instance want to limit their exposure to a contractual damage basis, not overtly linked to the project developer's loss of revenue. On the other hand, others may be prepared to give a more closely-aligned availability guarantee, but for small firms, this may be based upon a balance sheet that is dependent upon the success of the technology. In either case, the level of availability they are prepared to guarantee is normally going to be well below 100%, and this level will probably vary from project to project.

   Power curve warranties should be available from at least some OEM's and it is understood that there may be some interest from specialist commercial insurers in underwriting the OEM's power curve performance liabilities, but again excluding the machinery breakdown exposures.

   The scope of what other aspects are covered under warranties may vary – parts and labour required to repair defective parts would be normal, but the degree of sharing of retrieval costs and potential weather delay risk is likely to be more variable.

3) *Decommissioning bonds etc.:* The regulatory authorities are increasingly focussing on who bears the onus of decommissioning costs. In the event that a project is successful, these would eventually be addressed by a sinking fund building up gradually out of project revenues. The more immediate issue is that some sort of bond / escrow account arrangement will be required up front and will be

called upon in the event of the marine energy device failing. A project-specific special purpose vehicle will not be considered insurable for that reason, unless backed by guarantees from creditworthy parent companies, and it is likely that, in most cases, the project will have to provision for the full amount of expected decommissioning costs up-front, unless an alternative "bond" structure can be provided by the proposed insurance fund.

Conclusion:

In summary, the size and nature of the gaps are likely to vary from project to project. What is likely to be more consistent from project to project is the proposed end product from the investor's perspective – i.e. what is the bottom line for scope of cover and up to what level (e.g. what percentage availability, number of years etc.), we would need in order to leverage in sufficient extra investment capital to develop these next demonstration arrays?

We should attempt to calculate more accurately what the financial exposures could be for each project, and for each device within it.

Further Discussion will be arranged involving project developers, and potentially from external financiers – Green Giraffe, Green Investment Bank etc.

Question 1 – for Project developers - *What is the bottom line for scope of cover from warranties and insurances and up to what level?*

It has been noted that the warranty protection likely to be available from OEM's for these demonstration arrays will almost certainly fall below the level required by investors as above, and that this will vary, but it will be important to know by how much, and to what extent these warranty risks are mitigated by underlying warranties from tier 1 suppliers. We need to understand the range of potential warranty support from different OEM's expected to be engaged in these demonstration arrays, and in each case, what realistically is the maximum they can provide. We need to better understand the maximum financial commitment(s) likely to be offered by OEM's in respect of warranties for each device and per project.

Question 2 – For OEM / device manufacturers: Which range of potential warranty support are you offering/willing to offer specific to these first demonstration arrays rather than necessarily as a long-term commercial proposition?

(If necessary these answers could be subject to suitable confidentiality agreements)

3. What financial exposure should the fund absorb

The fund, and its potential for raising future capital, will need to be subject to a maximum level of exposure to any one project and/or device and/or device type. It is important to understand how much that exposure could be in terms of the gap between what investors need and OEM's can provide under warranty, added to any other risks to be insured, such as decommissioning etc. There will, for instance, be a large difference if investors were to require 5 year availability guarantees, rather than 3 year availability guarantees. This will become clearer in time, but as a working number, we have assumed that a maximum level of exposure to the proposed fund might be €20m per project.

The fund exposure should not be as high as the entire "gap" for each project. Given the relatively high level of uncertainty on an individual project, any engagement by an insurance fund should also be "aligned" with a level of risk absorbed by the project sponsors. This concept of risk sharing, or "co-insurance" is discussed in principle in the chart in Appendix 2.

With the benefits of a spread of risk through a portfolio of projects and a spread of risk period through time, the fund would not need to be capitalised to the full level of its potential exposure for each project. Reinsurance should start to be available etc. and a total aggregate level of €50m to 70m has been proposed as seed capital from the EU.

Question 1: is the proposed maximum level of exposure per project (€20m) realistic considering the potential "gaps" and decommissioning costs? If not, how much would be needed and why? What timeframe should it cover?

Question 2: Would one or several of your project benefit from such a fund? Which total project costs would it incur and what level of exposure would it require?

4. Which technology should be eligible / which due diligence procedures to validate it

A key question is how to define what technology readiness levels are acceptable and what types of ocean energy technology should be acceptable. The fund is clearly targeted at technologies that are "first-farm-ready". Defining those might be less easy than defining acceptable criteria for them to be considered in projects supported by the fund.

Such criteria should be based on a due diligence seen to be robust. These should ideally cover areas such as:

- How long a prototype needs to have been deployed in an approved ocean environment?
- Which test sites are permissible?
- What modifications from the originally tested prototype are acceptable for the demonstration array;
- What basic level of prior certification can and should be obtained? And what would be the cost implications?
- Should prior testing e.g. accelerated lifetime testing of drive trains at Narec, be factored in into acceptance and/or pricing criteria;
- Contractual risk allocation structure;
- Credit exposure to OEM warranties;
- Project contingency levels etc.
- Spare parts holdings, replacement lead times etc.;
- Installation and repair procedures, costs and exposure to weather risk

Question 1: Are some of those criteria not relevant and why? Can you think of additional criteria and why?

Question 2 specifically for verification bureaux or test sites: can you make a proposal for each or some of the above criteria?

Question 3: What cost is acceptable for such a due diligence process, given these are first projects that should not bear the burden of a full due diligence process?

5. Geographical acceptance criteria

The intent is to obtain EU support for emerging Ocean Energy Technologies reaching demonstration array status to prove the technology. This public support is likely to be subject to a number of conditions, including potentially:

- where the projects should be;
- where the OEM's should be based and/or devices manufactured / assembled;

Where projects should be located has an impact on jobs and value creation and is likely to be a considered as potential requirement for eligibility for the insurance fund.

"Local content requirements" for public support, are in theory discouraged, nevertheless, national and regional authorities have ways to make a location more suitable than another when trying to attract investors.

Question 1: Which geographical criteria are ideal/acceptable for the industry

Question 2: Given the low state of deployment of the industry and its manufacturing capacity, how much of a hindrance could such requirements be?

Question 3: Are other conditions than purely geographical likely to emerge and which?

6. "Insurance" Fund structure

Dependent upon the responses to the sections above a detailed follow-on paper will be drafted for review by interested parties to discuss various structural issues relating to the proposed insurance fund, including:

- Insurance policy versus cash in escrow account (bearing in mind the ability to reduce capital requirements through portfolio and risk sharing mechanisms)
- If an insurance, consider captive reinsurance structures to allow a well rated insurance company to issue the paper;
- How comprehensive a "wrap" would the insurance policy etc. need to be? There are differences between insurance policies and warranties that would need careful thought and structuring.
- Consider how reinsurances etc. might be brought into play to mitigate risk;
- Consider how to assess the appropriate risk premium in each instance (and appropriate low claims rebate mechanisms?)

7. Risk-sharing – enabling private funds to contribute to the insurance fund

The November 2015 OEE Conference& Exhibition in Dublin saw a discussion involving key project developers and OEM's revolving around industry participants capitalising a risk fund in addition to seeking EU and other public finance support. Doubts were raised by one of the OEM's about whether they would be able to support a fund exposed to other OEM's technologies. We assume that the industry co-financing a fund with exposure to devices from multiple OEM's is therefore a non-starter.

This though raises the question of whether the **co-insurance concept could be expanded** rather more than the 10% example suggested in the appendix: if the maximum liability for the insurance gap for a specific project, including all of heads of cover, is assessed at €20m for 100%, then is there a possibility of the project developer and OEM combining to fund up to say 50% of the insurance gap for that specific project. The "fund" would provide the insurance for the other 50% + of the exposures on each of a series of projects thereby achieving diversification, whereas the developer / OEM concerned in each project would only be at risk in respect of those projects in which they have a direct interest.

Some projects will have greater access to funds than others for such an arrangement, so there may need to be some flexibility in approach, e.g. larger levels of co-insurance where higher capital amounts are required?

Question 1: How much of the insurance gap should be shouldered by the project/device developer and how much should be covered by the fund? Taking into account the fundamental objective to de-risk first projects and the need to keep some incentive for private actors to minimise costs and risks?

8. Any other comments/information you might have…

9. Appendix 1: Text from OEF Strategic Roadmap

4.4 Demonstration and Pre-Commercial: Create an EU insurance fund to underwrite demonstration project risks

4.4.1 Challenge

Lack of empirical experience and deployment data results in uncertainties about ocean energy projects' operation and production. This means that ocean energies bear a higher technological and financial risk compared to more mature energy technologies. At present there is only limited protection available from the commercial insurance market or from manufacturer warranties.

At project level, this risk is currently overwhelmingly borne by the project developers, both limiting their pool of potential equity finance and making it difficult to leverage their funds to access commercial project finance.

4.4.2 Approach

An insurance fund to insure project revenues in the early years would make projects considerably more investable. A sectoral pan-EU approach, covering all demonstration and pre-commercial farms could absorb a large share of this risk element and, thereby, lower the cost of capital and ease access to finance.

A fund that would underwrite project risks should be investigated as a potentially appropriate mechanism for supporting the sector. It could cover risks such as availability, output performance, mechanical breakdown, and defect and could provide long-term decommissioning bonds. It would be subject to suitable acceptance, risk-sharing and eligibility criteria. A relatively small amount of risk underwriting capital should be able to leverage a considerably larger amount of finance into the projects.

4.4.3 Benefit

A fund in the order of €50m to €70m of underwriting risk capital could be sufficient to deploy and re-deploy across multiple projects, with the ability to raise additional private sector funding and (re) insurance market support growing through time as data availability and spread of risk improves.

4.4.4 Potential funding sources

National (Green) Investment Banks, European Investment Bank, Member State budgets, national revenue from the Emission Trading System, European Fund for Strategic Investments. EIB programmes such as InnovFin or EFSI

ACTION FOR EU, MEMBER STATES AND THE OCEAN ENERGY SECTOR (INDUSTRIAL PLAYERS)

- Create a capital risk underwriting fund in 2016 to support deployment of the first demonstration and pre-commercial farms, defining scope of cover to be provided, underwriting, risk-sharing and acceptance criteria.

- Finalise insurance design, including limits, self-insurance levels, premium rates and distribution mechanisms. Timeline: 2016 launch and ongoing

10. Appendix 2: Text of presentation to DG Mare and EIB, October 2015

The Issues

Prior operating data is very limited;

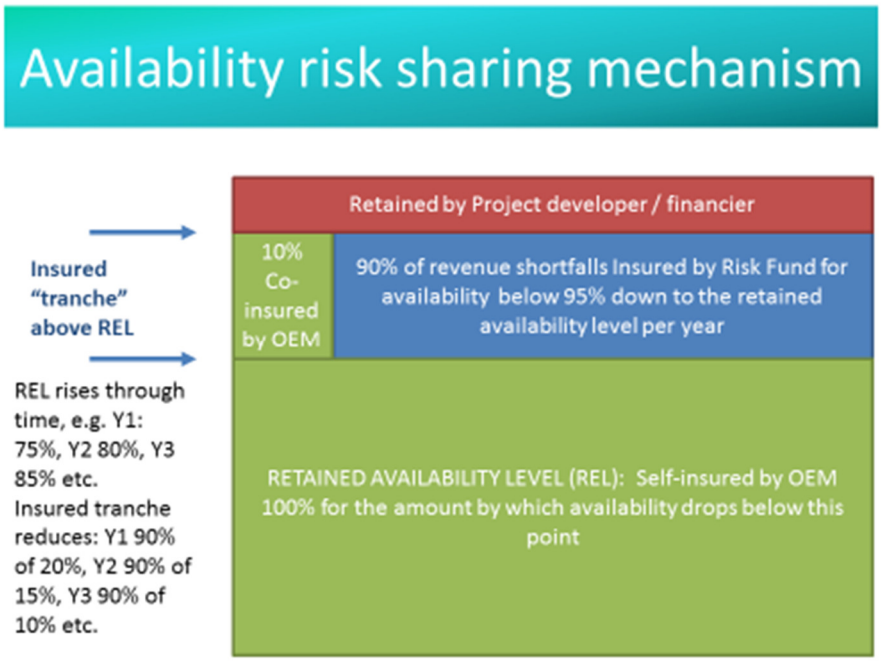
- OEM power curve & availability warranties limited or non-existent;
- Insurance excludes machinery breakdown / defect;
- Technology risk mainly falls on project developers with limited balance sheets;
- Equity investment harder to attract, commercial project finance harder still.

Tidal Power example

- Insurance ex. defect and machinery breakdown;
- Some power curve / parts warranties, risks shared on intervention cost, no availability warranty;
- Period of continuous running prior handover;
- Interventions balance: vessel costs v revenue;
- Agreements on spares holdings;
- Project contingency funds topped up from revenue;
- Liquidated damages on performance etc.
- Phase 2 broader warranties and insurance?

Potential solution and scale

- Fund providing insurance "wrap" for demo projects;
- Insured events just to "plug the gaps", potentially including decommissioning;
- Captive reinsurer using well rated insurer "front";
- Gradual ability to add capacity via reinsurance;
- Charge premium (& claw back losses?) and recycle funds as individual projects mature;
- Limit per project tba, e.g.< €20m "notional";
- Maximum fund capital requirement e.g. €50-70m?
- Duration 3 - 5 years per project - Rollovers?



Possible due diligence requirements

- Earlier "successful" full scale prototype in comparable environment / conditions;
- Handover criteria;
- Spares assessed v. MTBF and lead times to replace;
- Link to reliability studies via test centres etc.;
- Contractual assessment: penalties, SLA's, length of warranties etc.;
- Project contingency levels and top-up mechanisms;
- Agreed intervention procedures.

Benefits

- Structuring mitigates risk e.g. of loan guarantees;
- Criteria act as guideline for financial, contracting and spares strategies;
- Risk sharing mechanisms keep all parties involved to appropriate levels;
- Initial risk capital can stimulate other risk bearing capital and reinsurance;
- Risk bearing structure leverages much greater amount of equity investment and project finance.

Next Steps

- Indication of interest;
- Refine variables to identify bottom line gaps – limits, duration, benchmark versus offshore wind, level of availability needed (difference between 95% and 75%)… liaise with financiers, reinsurers, developers, OEM's;
- Refine business plan: detailed structure, definitions of heads of cover, criteria etc.